

Monthly Marine Biotoxin Report

October 2008

Technical Report No. 08-27

INTRODUCTION:

This report provides a summary of biotoxin activity for the month of October, 2008. Ranges of toxin concentrations are provided for the paralytic shellfish poisoning (PSP) toxins and for domoic acid (DA). Estimates are also provided for the distribution and relative abundance of *Alexandrium*, the dinoflagellate that produces PSP toxins, and *Pseudo-nitzschia*, the diatom that produces domoic acid. Summary information is also provided for any quarantine or health advisory that was in effect during the reporting period.

Please note the following conventions for the phytoplankton and shellfish biotoxin distribution maps: (i) All estimates for phytoplankton relative abundance are qualitative, based on sampling effort and percent composition; (ii) All toxin data are for mussel samples, unless otherwise noted; (iii) All samples are assayed for PSP toxins; DA analyses are performed as needed (i.e., on the basis of detected blooms of the diatoms that produce DA); (iv) Please refer to the appropriate figure key for an explanation of the symbols used on the maps.

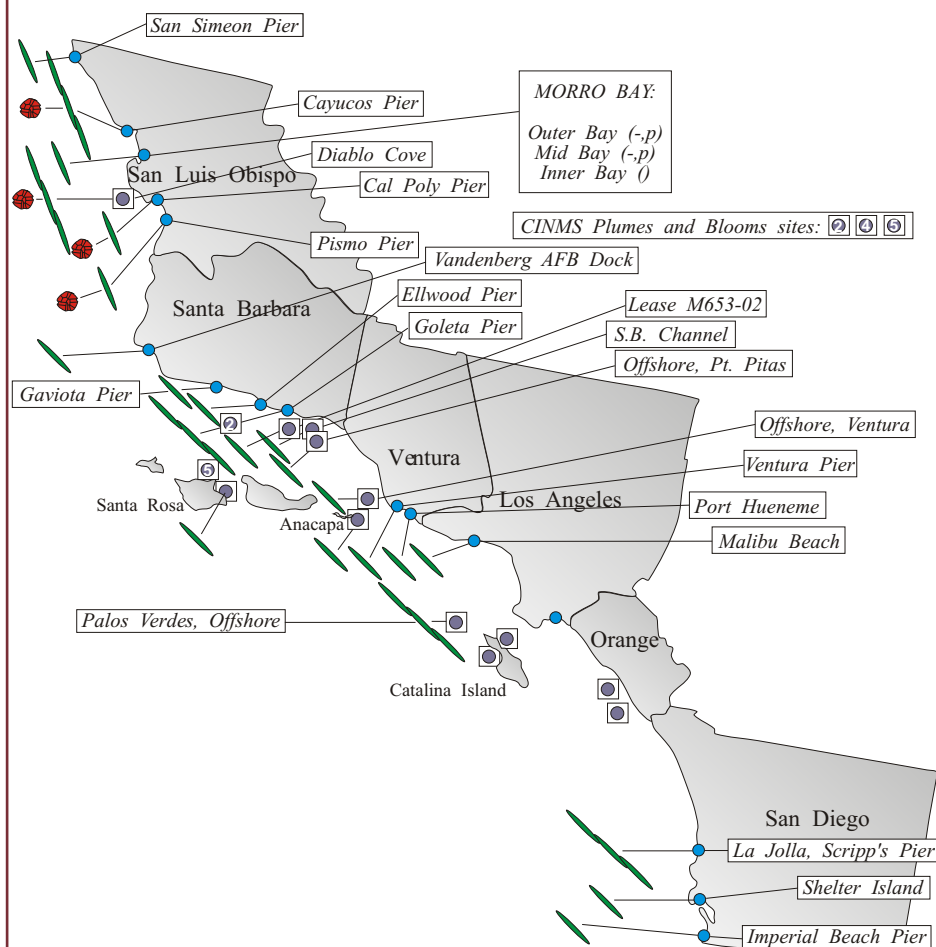
Southern California Summary:

Paralytic Shellfish Poisoning

Alexandrium was observed at several sampling stations during October (Figure 1). This dinoflagellate was observed in very low numbers at several sites in San Luis Obispo County, representing an increase locally but

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Figure 1. Distribution of toxin-producing phytoplankton in Southern California during October, 2008.



Relative Abundance of Known Toxin Producers

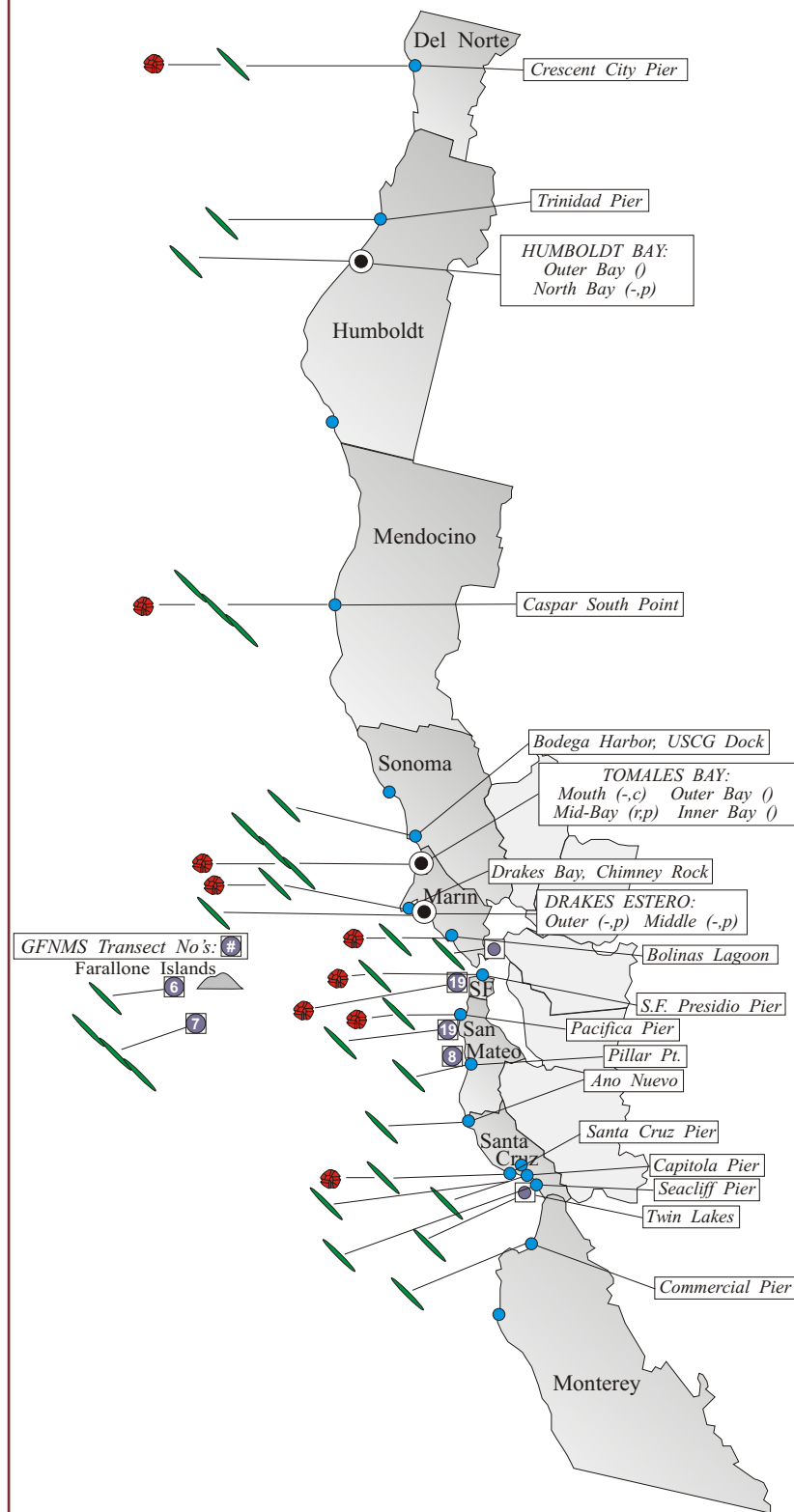
Alexandrium Species		Pseudo-nitzschia Species	
	Rare (less than 1%)		Present (less than 10%)
	Present (between 1% and 10%)		Common (between 10% and 50%)
	Common (between 10% and 50%)		Abundant (greater than 50%)
	Abundant (greater than 50%)		

MONTHLY SAMPLING STATIONS:

- Single Sampling Station
- Multiple Sampling Stations
- Offshore Sampling Station

For areas with multiple sampling stations, species abundance at each station is represented as follows:
(a,p) = Abundance for *Alexandrium* and *Pseudo-nitzschia*.
e.g., (c,p) = common, present; (a,-) = abundant, not observed

Figure 2. Distribution of toxin-producing phytoplankton in Northern California during October, 2008.



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an overall decrease in distribution coast-wide compared to observations in September. PSP toxins were not detected in any shellfish samples collected in October (Figure 3).

Domoic Acid

Pseudo-nitzschia was detected at most sites between San Luis Obispo and San Diego counties (Figure 1). The distribution of this diatom was similar to observations in September but the relative abundance increased in most areas. Domoic acid was not detected in any shellfish samples collected along the southern California coast in October (Figure 3).

Non-toxic Species

Several species of diatoms and dinoflagellates were common along the southern California coast in October. Common diatoms included *Eucampia*, *Chaetoceros* and *Leptocylindrus*. *Prorocentrum* was the most abundant dinoflagellate observed along much of the coast. *Cochlodinium* was common at several sites along the San Luis Obispo coast, while several species of *Ceratium* were common at some locations.

Northern California Summary:

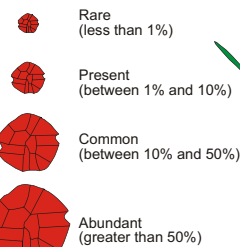
Paralytic Shellfish Poisoning

Alexandrium was observed at several

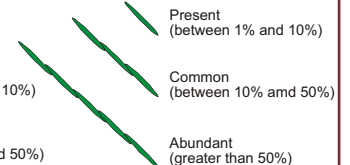
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Relative Abundance of Known Toxin Producers

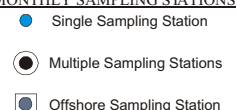
Alexandrium Species



Pseudo-nitzschia Species



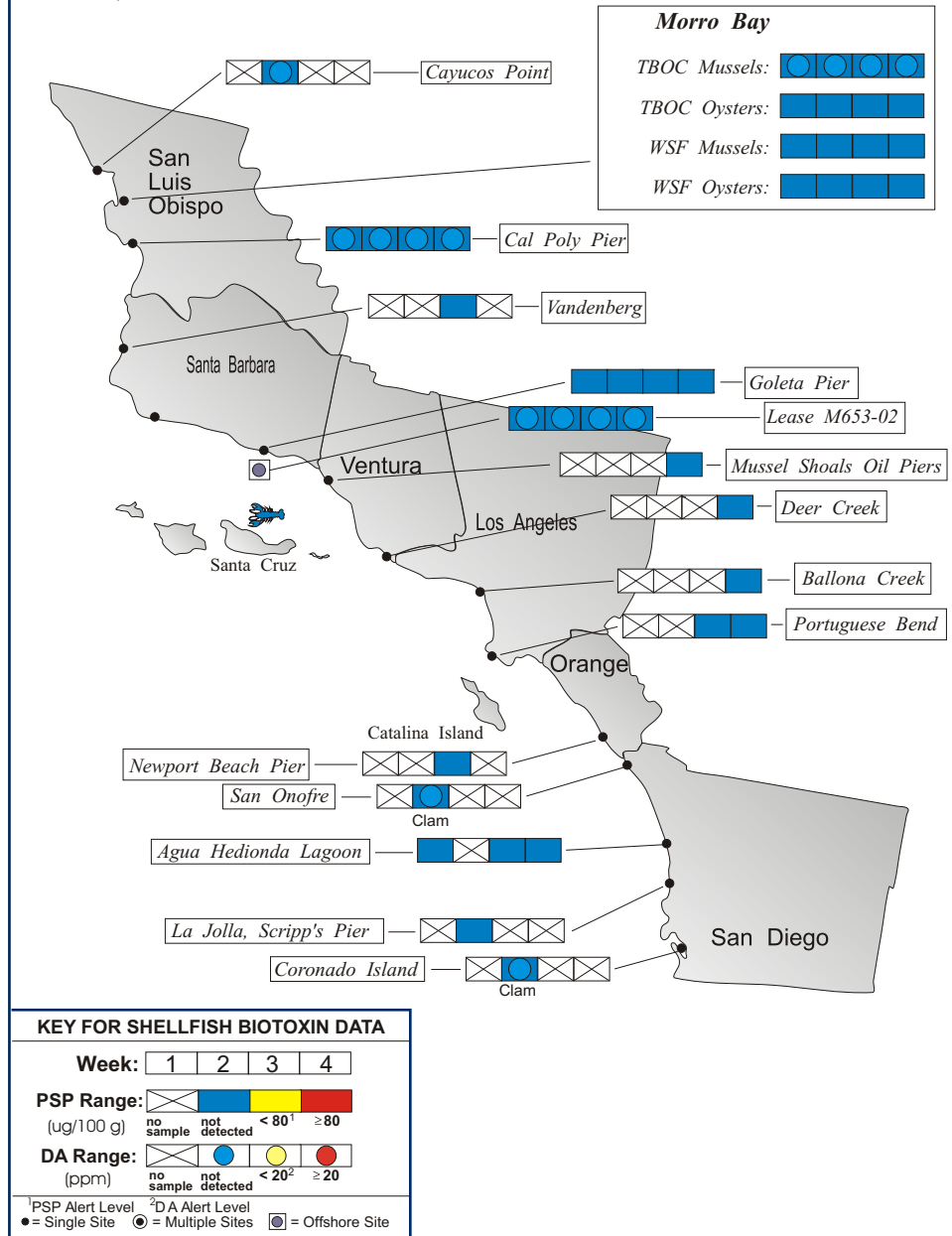
MONTHLY SAMPLING STATIONS:



For areas with multiple sampling stations, species abundance at each station is represented as follows:

(A,P) = Abundance for *Alexandrium* and *Pseudo-nitzschia*.
e.g., (c,p) = common, present; (a,-) = abundant, not observed

Figure 3. Distribution of shellfish biotoxins in Southern California during October, 2008.



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northern California sampling sites in October (Figure 2). This dinoflagellate was mostly observed at sites between Marin and San Mateo counties, but was also detected at individual sites in Santa Cruz, Mendocino, and Del Norte counties. The overall distribution of *Alexandrium* was similar to observations in September.

PSP toxins were detected in mussels collected at several locations, primarily towards the latter half of the month. Low concentrations of these toxins were detected in shellfish from Marin and Humboldt counties (Figure 4). Elevated PSP toxin levels were reported in southern Oregon, but these toxins were not detected in mussels or crab viscera collected in Del Norte County despite the presence of very low numbers of *Alexandrium*.

Domoic Acid

Pseudo-nitzschia continued to be observed along most of the northern California coast during October (Figure 2). The relative abundance decreased significantly compared to observations in September. A mix of the seriata and delicatissima complexes of this diatom were observed. A very low concentration of domoic acid (~ 1 ppm) was detected in a sentinel mussel

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The Marine Biotoxin Monitoring and Control Program, managed by the California Department of Public Health, is a state-wide effort involving a consortium of volunteer participants. The shellfish sampling and analysis element of this program is intended to provide an early warning of shellfish toxicity by routinely assessing coastal resources for the presence of paralytic shellfish poisoning (PSP) toxins and domoic acid.

The Phytoplankton Monitoring Program is a state-wide effort designed to detect toxin producing species of phytoplankton in ocean water before they impact the public. The phytoplankton monitoring and observation effort can provide an advanced warning of a potential toxic bloom, allowing us to focus sampling efforts in the affected area before California's valuable shellfish resources or the public health is threatened.

For More Information Please Call:
(510) 412-4635

For Recorded Biotoxin Information Call:
(800) 553-4133

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sample from Sant Cruz Pier on October 1.

Non-toxic Species

The phytoplankton assemblage along the northern California coast continued to be dominated by diatoms for most of the month. The most common genera observed were *Thalassiosira*, *Chaetoceros*, *Skeletonema*, *Thalassionema*, and *Odontella*. The dinoflagellate *Prorocentrum* was common at various sites between Sonoma and Santa Cruz counties. *Ceratium furca* was also common between San Francisco and Santa Cruz counties.



QUARANTINES:

The annual mussel quarantine, which began on May 1, was rescinded on schedule at midnight on October 31. The annual quarantine applies specifically to sport-harvesting of mussels along the entire California coastline, including all bays and estuaries. Routine phytoplankton and biotoxin monitoring is maintained throughout the year, not just within the quarantine period. This allows the detection of unexpected increases in biotoxin activity outside of the routine quarantine period. The annual quarantine does not apply to the certified commercial shellfish growing areas in California, which are monitored intensively. All certified shellfish growers are required to submit at least weekly samples of

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Figure 4. Distribution of shellfish biotoxins in Northern California during October, 2008.

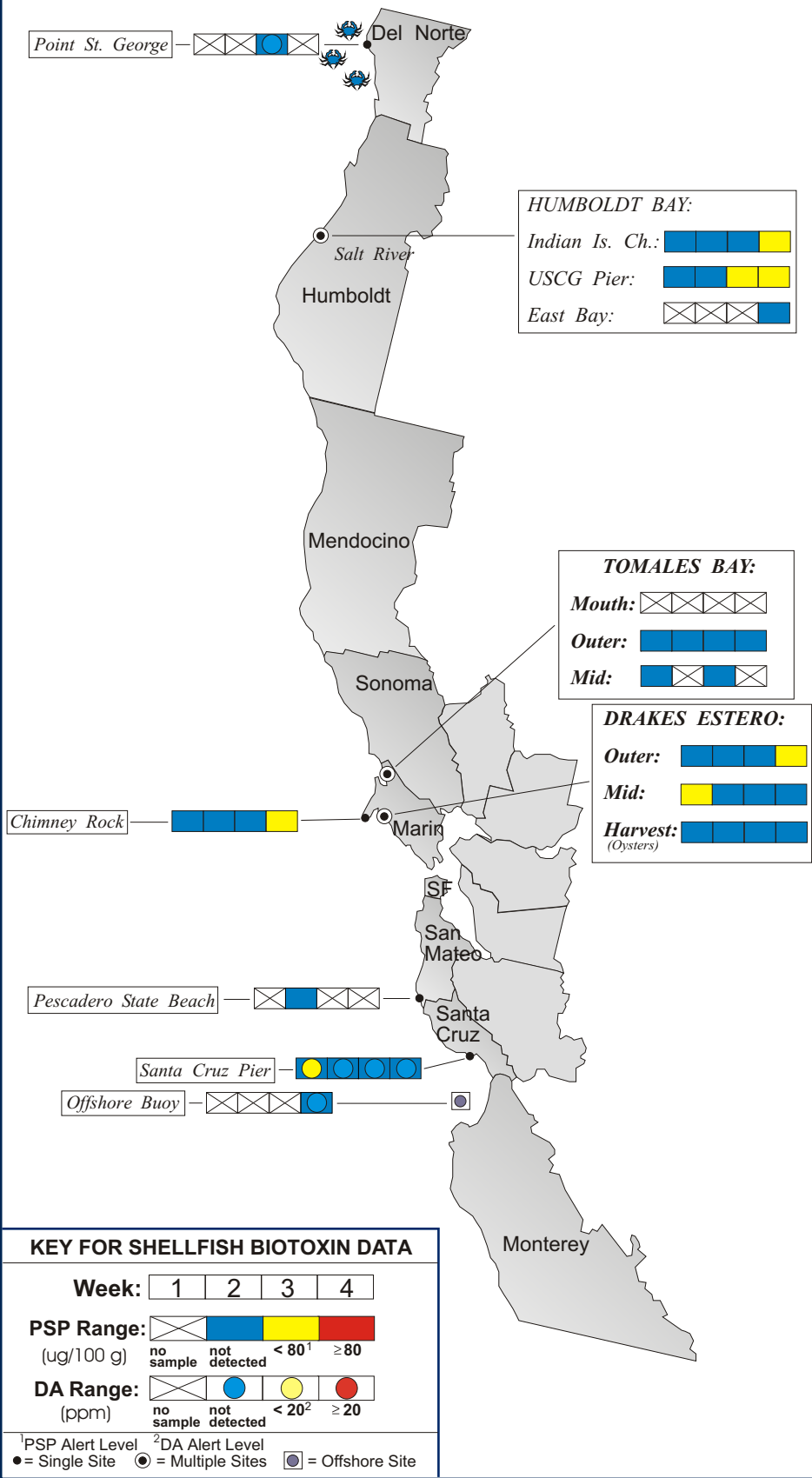


Table 1. California Marine Biotoxin Monitoring Program participants submitting shellfish samples during October, 2008.

COUNTY	AGENCY	# SAMPLES
Del Norte	Del Norte County Health Department	1
	California Department of Fish and Game	4
Humboldt	Coast Seafood Company	10
Mendocino	None Submitted	
Sonoma	None Submitted	
Marin	Cove Mussel Company	2
	Drakes Bay Oyster Company	20
	Hog Island Oyster Company	4
	Marin Oyster Company	4
	CDPH Marine Biotoxin Monitoring Program	9
San Francisco	None Submitted	
San Mateo	San Mateo County Environmental Health Department	1
Santa Cruz	U.C. Santa Cruz	5
Monterey	U.C. Santa Cruz	3
San Luis Obispo	Cal Poly	4
	Tomales Bay Oyster Company	10
	Williams Shellfish Farms	8
	CDPH Volunteer (<i>Otto Schmidt</i>)	1
Santa Barbara	Santa Barbara Mariculture Company	10
	U.C. Santa Barbara	4
	Vandenberg AFB	1
Ventura	Ventura County Environmental Health Department	2
	CDPH Volunteer (<i>Bill Weinerth</i>)	1
Los Angeles	Los Angeles County Health Department	3
Orange	Orange County Health Care Agency	1
San Diego	Carlsbad Aquafarms, Inc.	3
	CDPH Volunteer (<i>Steve Crooke</i>)	2
	Scripps Institute of Oceanography	1

shellfish for toxin monitoring. Harvest restrictions or closures are implemented as needed to protect the public's health.

Consumers of Washington clams, also known as butter clams (*Saxidomus nuttalli*), are cautioned to eat only the white meat. Washington clams can

concentrate the PSP toxins in the viscera and in the dark parts of the siphon and can remain toxic for a long period of time. Persons taking scallops or clams, with the exception of razor clams, are advised to remove and discard the dark parts (i.e., the digestive organs or viscera). Razor

clams (*Siliqua patula*) are an exception to this general guidance due to their ability to concentrate and retain domoic acid in the edible white meat as well as in the viscera. These toxins may also accumulate in the viscera of other seafood species such as crab, lobster, and small finfish like sardines and anchovies.

PSP toxins affect the human central nervous system, producing a tingling around the mouth and fingertips within a few minutes to a few hours after eating toxic shellfish. These symptoms typically are followed by disturbed balance, lack of muscular coordination, slurred speech and difficulty swallowing. In severe poisonings, complete muscular paralysis and death from asphyxiation can occur.

Symptoms of domoic acid poisoning can occur within 30 minutes to 24 hours after eating toxic seafood. In mild cases, symptoms of exposure to this nerve toxin may include vomiting, diarrhea, abdominal cramps, headache and dizziness. These symptoms disappear completely within several days. In severe cases, the victim may experience excessive bronchial secretions, difficulty breathing, confusion, disorientation, cardiovascular instability, seizures, permanent loss of short-term memory, coma and death.

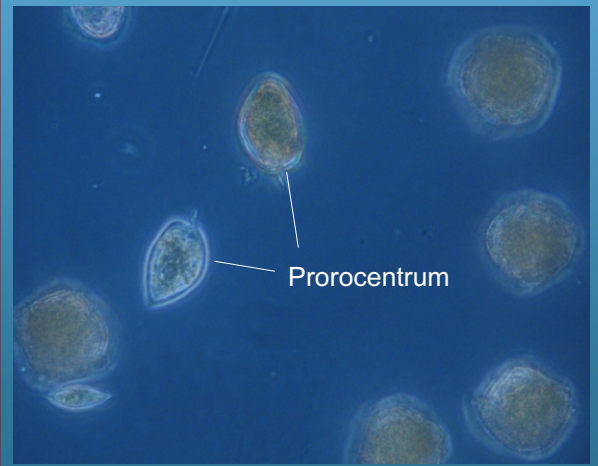
Any person experiencing any of these symptoms should seek immediate medical care. Consumers are also advised that neither cooking or freezing eliminates domoic acid or the PSP toxins from the shellfish tissue. Sport harvesters are encouraged to contact the "Biotoxin Information Line" at 1-800-553-4133 for a current update on marine biotoxin activity prior to gathering and consuming shellfish.



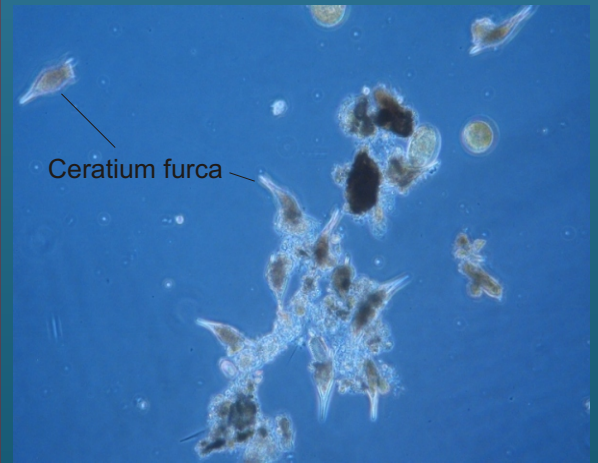
Table 2. Agencies, organizations and volunteers participating in marine phytoplankton sample collection during October, 2008.

COUNTY	AGENCY	# SAMPLES
Del Norte	Del Norte County Health Department	4
Humboldt	Coast Seafood Company	4
	California Department of Fish and Game	2
	Bureau of Land Management	2
Mendocino	None Submitted	
Sonoma	CDPH Volunteer (<i>Cathleen Cannon</i>)	1
Marin	CDPH Volunteers	8
	(<i>Brent Anderson, Cal Strobel, Richard Plant</i>)	
	Drakes Bay Oyster Company	10
	CDPH Marine Biotoxin Program	4
San Francisco	CDPH Volunteer (<i>Eugenia McNaughton</i>)	2
	Gulf of the Farallones National Marine Sanctuary	1
	San Francisco Health Department	1
San Mateo	CDPH Volunteer (<i>Kathleen Abadie</i>)	3
	The Marine Mammal Center (<i>Stan Jensen</i>)	4
	San Mateo County Environmental Health Dept.	2
	Gulf of the Farallones National Marine Sanctuary	4
	U.C. Santa Cruz	2
Santa Cruz	California Department of Parks and Recreation	2
	The Marine Mammal Center (<i>Nancy Scarborough</i>)	1
	San Lorenzo Valley High School	1
	Santa Cruz County Environmental Health Dept.	3
	U.C. Santa Cruz	5
Monterey	Monterey Abalone Company	2
San Luis Obispo	CDPH Volunteer (<i>Renee and Auburn Atkins</i>)	1
	Cal Poly	14
	Monterey Bay National Marine Sanctuary	3
	Morro Bay National Estuary Program	1
	Tenera Environmental	2
	The Marine Mammal Center (<i>Tim Lytsell</i>)	10
	Tomaes Bay Oyster Company	5
Santa Barbara	CDPH Volunteer (<i>Sylvia Short</i>)	3
	National Park Service	2
	Channel Islands National Marine Sanctuary	3
	CDPH Marine Biotoxin Program	1
	Santa Barbara Channel Keeper	3
	Santa Barbara Mariculture Company	5
	Vandenberg AFB	1
	U.C. Santa Barbara	6
Ventura	CDPH Volunteer (<i>Fred Burgess</i>)	3
	Channel Islands National Marine Sanctuary	2
	Ventura County Environmental Health Department	1
Los Angeles	Catalina Island Marine Institute	5
	City of Los Angeles Environmental Monitoring Div.	1
	Los Angeles County Sanitation District	5
	Southern California Marine Institute	1
Orange	Orange County Health Care Agency	1
	Ocean Institute	1
San Diego	Avian Research Associates	3
	CDPH Volunteer (<i>Paul Sims</i>)	2
	Scripps Institute of Oceanography	4

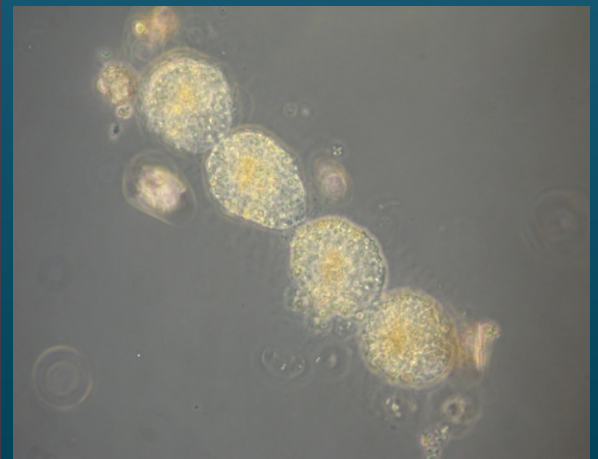
PHYTOPLANKTON GALLERY



The leaf-shaped dinoflagellate *Prorocentrum* was common along the coast between Marin and San Diego counties..



The dinoflagellates *Ceratium furca* and *Cochlodinium* sp.; The latter disintegrates upon preservation (see photo below).



Cells of the dinoflagellate *Cochlodinium* "explode" upon preservation, but many maintain this characteristic shape.